REMARKS

Disposition of Claims

Upon entry of the foregoing amendments, claims 1, 6, 8, 11, 13, 15, and 17-22 will be pending in the application and stand ready for further action on the merits. Independent claims 1 and 11 have been amended herein to recite that the heat-generating electronic components comprise a photo-diode and laser. Claims 1 and 11 also have been amended to clarify that the housing, which is made of a thermally-conductive polymer composition, is molded over the heat-generating electronic components, and the molded housing has first and second ports for receiving cables fitted with complementary plugs. Claims 6 and 8 are dependent upon amended claim 1, and claims 13 and 15 are dependent upon amended claim 11. Claims 4 and 5 have been canceled herein without prejudice or disclaimer of the subject matter contained therein.

Also, new claims 17-22 have been added. These new claims are directed to electronic connectors having a heat-generating electronic component mounted on a circuit board. A thermally-conductive housing is molded over the electronic component and circuit board to form a molded assembly. Each of amendments herein is fully supported by the specification particularly at Paragraphs 41- 43; the drawings particularly at Figure 2; and the originally filed claims. No new matter has been added to the application.

Rejections Under 35 U.S.C. §103

Addressing the points raised in the Office Action, claims 1, 4, 8, 11, 13, and 15 are rejected under 35 U.S.C.§103(a) as being unpatentable over Baumberger et al., U.S. Patent 5,230,632 ("Baumberger"); in view of Juskey et al., U.S. Patent 5,371,404 ("Juskey") and Zhuo et al., U.S. Patent 6,162,849 ("Zhuo"). Applicants submit that the present invention, as recited in amended claims 1, 4, 8, 11, 13, and 15, is not prima facie obvious over the disclosures in Baumberger, Juskey, and Zhuo for the reasons discussed below.

First, Applicants agree with the Examiner that Baumberger an electrical connector assembly which includes a housing for C-shaped electrical contacts. Referring to FIG. 2 and column 6, lines 21-38 in Baumberger, the housing (31) includes a main body portion (43) which is made of an electrically-conductive material (e.g., stainless steel, copper, or electrically conductive polymer such as carbon-filled, liquid crystal polymer). The housing includes a chamber (41) for retaining the C-shaped electrical contact (10). The chamber (41) has an internal width slightly greater than the thickness of the electrical contact (10). The housing (31) further includes a pair of cover members (45). The covers (45) can be fastened to the body portion by clamping, and at least one of the covers is removable so that the electrical contacts (10) can be removed in the event of repair and/or replacement. The housing (31) may be electrically connected to circuit members (33 and/or 35) by electrical contacts (10). One of the circuit members (33, 35) is preferably an integrated circuit while the other is preferably a printed circuit board.

In contrast to the housing described in Baumberger, Applicants' electronic connector, as recited in amended claims 1, 4, 8, 11, 13, and 15, has a completely different structure. First, Applicants' housing encloses a heat-generating photo-diode and laser, rather than C-shaped electrical contacts as described in Baumberger. Secondly, Applicants' housing is molded over the heat-generating components to form a unitary, molded structure. The over-molded housing surrounds and touches the heat-generating components. Baumberger does not describe molding a housing over the C-shaped contacts. Rather, the C-shaped contacts are described as being separate and removable components located within a chamber of the housing. Thirdly, Applicants' housing is molded over the electronic components so as to form a molded housing containing first and second ports adapted for receiving cables having complementary plugs. Fiber-optic and electronic cables can be plugged into the ports as recited in claim 6. Clearly, there is no disclosure or suggestion in Baumberger for a molded, plastic housing having first and second ports as recited in the amended claims.

Turning to the Juskey reference, a semiconductor device package having a circuit-carrier substrate with an integrated circuit (IC), such as a semiconductor die or chip, is

described therein. The substrate has a metallization pattern on its upper side, and solder pads mounted on its lower side. The substrate, which carries the IC, can be a glass-reinforced printed circuit board. The solder pads are used for attaching the semiconductor package to a larger substrate such as a mother board. Juskey teaches encapsulating the semiconductor assembly by placing it in a molding cavity and transfer-molding a thermoplastic or thermoset molding compound around the assembly. During this operation, the molding compound flows around the IC to encapsulate it. As the Examiner points out, the molding compound can be filled with aluminum, nickel, gold, or "similar type materials" to provide electrical and thermal conductivity. (column 4, lines 14-17).

But, the structure of the semiconductor packaging assembly, as described in Juskey, differs significantly over the electrical connector defined in amended claims 1, 4, 8, 11, 13, and 15. Juskey does not disclose heat-generating laser and photo-diode elements. Furthermore, there is no disclosure or suggestion in Juskey for an assembly containing first and second ports. These open ports are significant components to Applicants' molded housing. The ports are adapted for receiving cables, particularly fiber-optic and electrical cables, fitted with complementary plugs. Plugging these cables into the ports of the housing allows the connector to receive and transmit optical and electrical signals as described at Paragraph 42 of the Specification.

Lastly, Applicants recognize that Zhuo discloses a thermally conductive, moldable polymer blend that includes about 15% to about 40% by weight of a thermoplastic base resin; at least 60% by weight of boron nitride filler; and about 0.1% to about 5% by weight of a coupling/dispersing agent. As the Examiner further points out, Zhuo discloses that liquid crystal polymers can be used in the blend. The Examiner takes the position that it would have been obvious to use the polymer composition, as described in Zhuo, to make the electrical contact package shown in Baumberger or semiconductor device package shown in Juskey.

However, there is no disclosure or suggestion in Baumberger or Juskey for the presently claimed housing structure. Thus, even if the teachings in Zhuo were combined with the teachings in Baumberger and Juskey, the housing structure of this invention would not be obvious to a person of ordinary skill in the art. As discussed above, Applicants' housing is made by molding a polymer composition over the heat-generating photo-diode and laser components to form a molded housing containing first and second ports adapted for receiving cables. The housing and heat-generating components form an integrated, molded structure with open connector ports therein. Independent claims 1 and 11 have been amended to clarify this over-molded housing structure. Claims 6 and 8 are dependent upon amended claim 1, and claims 13 and 15 are dependent upon amended claim 11.

Clearly, there is no suggestion or hint of such a molded housing structure in the disclosures of Baumberger, Juskey, and Zhuo taken alone or in combination. Thus, a person of ordinary skill in the art would have no basis for modifying these disclosures in order to produce the presently claimed housing structure. Accordingly, it respectfully is requested that the rejection of claims 1, 4, 8, 11, 13, and 15 (as amended) under 35 U.S.C. §103(a) in view of Baumberger, Juskey, and Zhuo be withdrawn.

Next, the Office Action states that claims 1, 5, and 6 are rejected under 35 U.S.C.§103(a) as being unpatentable over Lebby et al., U.S. Patent 5,511,138 ("Lebby") in view of Juskey and Zhuo. The rejection of claim 1 in view of Baumberger, Juskey, and Zhou has been addressed above. As far as Lebby is concerned, this reference is directed to methods of fabricating optical waveguides. Turning to FIG. 1 in Lebby, the optical module (101) includes optical connectors (102) and (103). The optical module (101) further includes interlocking waveguides (104) and (106) and an interconnect substrate (107). Alignment pins (139) and (141) are used to guide the optical connectors (102) and (103) to adjoining optical waveguides (104) and (106) for proper optical coupling. Photonic devices (116) and (117) are aligned and mounted to the optical waveguides (104) and (106). Lebby further discloses that the photonic devices (116) and (117) can be photo-transmitters such as lasers or photo-receivers such as photo-diodes.

(column 3, lines 3-13). However, Lebby fails to disclose or suggest an electrical connector as recited in amended claims 1, 5, and 6.

There is no teaching in Lebby for molding a polymer composition over heat-generating photo-diode and laser elements to form an integrated structure. Rather, in Lebby's optical module, the photonic devices (116) and (117) are separate pieces that are mounted to the optical waveguides(104) and (106). Further, there is no suggestion in Lebby for making an electrical connector having first and second ports adapted for receiving cables fitted with complementary plugs. Thus, even if the teachings in Juskey and Zhuo (discussed above) were combined with the teachings in Lebby, there would be no suggestion for making the presently claimed invention.

Applicants believe that claim 1 (as amended) is in condition for allowance for the reasons discussed above. Claim 6 depends upon amended claim 1 and accordingly should be allowable. Claim 5 has been canceled and its limitations have been incorporated into claim 1. In view of the foregoing, Applicants respectfully request that the rejection of claims 1, 5, and 6 under 35 U.S.C. §103(a) in view of Lebby, Juskey, and Zhuo be withdrawn.

Conclusion

In summary, Applicants submit that claims 1, 4-6, 8, 11, 13, and 15 (as amended) are patentable and each of the Examiner's rejections and objections has been overcome. As far as new claims 17-22 are concerned, Applicants also believe that these claims are patentable over the cited prior art. Accordingly, Applicants respectfully request favorable consideration and allowance of amended claims 1, 4-6, 8, 11, 13, 15, and new claims 17-22.

The Commissioner is hereby authorized to charge any additional fee required in connection with the filing of this paper or credit any overpayment to Deposit Account 02-0900.

Should there be any outstanding matter that needs to be resolved in the present application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Respectfully submitted,
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